

Section 22 — The FUNt Universal Momentum Law (UML): Phase-Directed Motion and Breathing-Driven Trajectory

Section 22 establishes the FUNt Universal Momentum Law (UML), the harmonic law governing all motion. UML replaces classical momentum (mv) with phase-directed motion arising from lattice breathing, ϕ -band anchoring, and torsional–buoyant balance. Motion in FUNt is not mass-driven but coherence-driven: trajectory is a function of harmonic phase and breathing ratios.

22.1 Core Definition of UML

- Momentum = phase-directed displacement created by breathing asymmetry.
- Trajectory direction is set by $\Delta\phi$ (harmonic gradient).
- Trajectory magnitude is set by Δb (breathing differential).
- Classical mv emerges as a low-frequency approximation of UML.
- [Insert UML overview diagram here]

22.2 Formal Mathematical Expression of UML

UML is expressed as:

$$P = K_p \times (\Delta\phi \times \Delta b \times \Delta\tau_m)$$

Where:

- K_p = momentum coupling constant (scale-adaptive)
- $\Delta\phi$ = harmonic phase gradient
- Δb = breathing asymmetry
- $\Delta\tau_m$ = mixed torsional–buoyant contribution

- [Insert equation block here]

22.3 Phase-Directed Motion

- Momentum direction arises from the sign of $\Delta\phi$.
- Positive $\Delta\phi \rightarrow$ forward harmonic movement.
- Negative $\Delta\phi \rightarrow$ reverse/reflective harmonic movement.
- Zero $\Delta\phi \rightarrow$ no trajectory (pure breathing, no motion).
- [Insert phase-gradient diagram here]

22.4 Magnitude from Breathing Differential

- Momentum strength increases with breathing asymmetry.
- Large Δb = strong momentum; small Δb = weak momentum.
- This explains why electrons accelerate rapidly—low inertia, high Δb .
- Protons produce heavy trajectories—high inertia, lower Δb flexibility.
- [Insert breathing diagram here]

22.5 UML in Tunneling Events

- Tunneling is momentum with $\Delta\tau \approx 0$ (torsion suppressed).
- Momentum becomes pure $\Delta\phi \times \Delta b$ interaction.
- This produces near-instant relocation independent of classical barriers.
- UML resolves tunneling as deterministic harmonic motion.
- [Insert tunneling momentum diagram here]

22.6 UML in Classical Mechanics

- Classical momentum mv = low-frequency UML projection.
- Mass corresponds to NHIL anchoring strength (Section 15).
- Velocity corresponds to breathing-driven displacement rate.
- Newton's laws emerge from UML in ϕ^4 – ϕ^5 approximations.
- [Insert classical-projection diagram here]

22.7 Momentum in the Scalar-Field Regime

- At ϕ^9 , $\Delta\tau \rightarrow 0$ and $\Delta b \rightarrow 0$, making scalar momentum pure phase motion.
- Scalar momentum is instantaneous relative to classical inertia.
- This explains quantum jumps, photon emission directionality, and identity-collapse motion.
- [Insert scalar momentum diagram here]